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A COMPARISON OF ACCIDENT TYPES ON DIVIDED FOUR-LANE PAVEMENTS AND TWO-LANE ROADS

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UNANIMITY is not an innate characteristic of traffic engineering opinion. However, there does seem to be an almost complete concurrence in the belief that four-lane divided or dual highways are safer than other types of undivided roads. Since the Washington Department of Highways has about ninety miles of four-lane divided highways in use now and still more proposed for early construction, it was considered a wise action to examine the safety record of these roads and to ferret out any weaknesses in design that might require improvement.

The actual study of these accidents resolved itself into a classification by types of movement such as left and right turns, rear end collisions, etc., the complete list of which is shown in Figure I. Then to provide a basis for comparison and to demonstrate just what types of accidents divided highways are most effective in reducing, the same analysis was made for a typical section of two-lane highway.

The highway selected for study was U.S. 99 which extends from the Columbia River at the Oregon Boundary to the Canadian Boundary on the north. Approximately 65 miles of this highway was dual roadway lying between Olympia on the south and Everett on the north and traversing Seattle and Tacoma, the first and third largest cities respectively in the state. Only rural portions of the highways were considered, comprising an overall length of about 241 miles, made up of the above 65 miles of four-lane road and 175 miles of two-lane road.

In 1939 these rural road sections carried approximately 410,500,000 vehicle miles of travel with slightly more than half of this traffic moving on the two-lane pavement. Overall average annual daily traffic was 4,700 cars. Average daily traffic on dual highway was 7,760, and on the two-lane sections the volume was 3,530.

On rural U.S. 99 in 1939, 1,641 accidents occurred or an average of four for each million vehicle miles of travel. Thirty-nine of these accidents were fatal and 481 involved personal injury. The accident rate per million vehicle miles on four-lane and two-lane sections were 4.11 and 3.95 respectively, while the fatality rates were 11.5 and 7.9 per 10 million vehicle miles of travel. Excluding pedestrian deaths, this latter rate is 7.1 for four-lane and 5.7 for two-lane roads. From this it is apparent that the four-lane sections have a worse record on the basis of travel in both total accidents and fatalities.

Table I and its derived chart classify this accident experience and throw valuable light on why a theoretically safer highway does not prove to be safer in actual practice.

It must be admitted of course that the traffic volume on the dual highway is 2.2 times greater than on the two-lane road, but at the same time facilities are twice as great so it appears reasonable to suppose that exposure is not much greater on one than on the other. Therefore, we should be reasonably safe in saying that the roadway sections we are comparing are properly comparable and

TABLE I
MOTOR VEHICLE ACCIDENTS ON RURAL PRIMARY HIGHWAYS
1939

Type of Collision	*Location of Accidents* Four-Lane Test Section		Two-Lane Test Section		All Rural Primary Highways
	Fatal	All Accidents	Fatal	All Accidents	Fatal
	%	%	%	%	%
Rear End	5	35	5	26	4
Head-On	20	8	17	19	22
Overtaking and Passing	0	8	22	13	5
Driving Off Road	9	7	28	18	31
Pedestrian	38	5	28	2	28
Left Turns	14	23	0	13	4
Right Turns	0	2	0	0	0
Cross Movement	9	9	0	4	4
Unclassified	5	3	0	5	2
Total	100	100	100	100	100
At Intersections	14	43	6	16	6
Between Intersections	86	57	94	84	94

that our dual sections were actually somewhat less safe than selected sections of two-lane roads.

The truth of the matter is that the dual highway as such is not indicated by the statistics we have gathered here but rather a *particular* type of dual highway and this we shall discuss later. For instance, head-on collisions, overtaking and passing, and driving off the road accidents, which comprise 50% of all accidents on two-lane roads and 67% of the fatal accidents, are reduced on dual roads by more than 50%. However, this gain is offset by the substantial increases in left turn accidents, rear end collisions, and collisions with cars crossing at right angles.

Where we return to a consideration of the statement that these accident statistics are an indictment of a *particular type* of dual highway, i.e., a highway which has in providing some protection against certain types of accidents failed to provide protection against others and has actually made their occurrence more frequent.

In the case of the dual highway under examination here, the medial strip was four feet wide, separating two twenty-foot roadways. This cross section was carried straight through, no special provisions being made for intersections. It is a type of construction common throughout the country and in the case of this state is based on the design of the first dual highway constructed here in September of 1918.

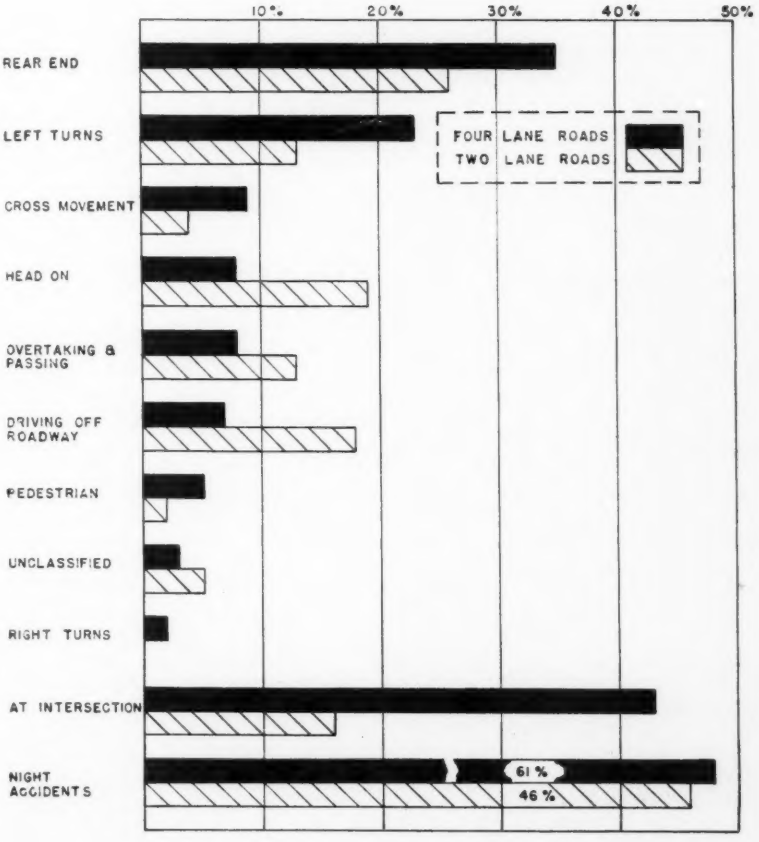
What the accident statistics quoted herein show to be the faults of this four-lane construction are:

1. While the four-foot medial strip has proved very valuable in reducing head-on collisions, it has not entirely eliminated them. Improvement could be made if the strip were widened or if a raised curb of proper design were placed in the center to make crossing practically impossible. This would also eliminate left turns between intersections, another source of accidents.
2. A large number of accidents are caused at intersections by cars turning left. By flaring the medial strip to a proper width and providing a recessed lane for cars turning left off the main highway, accidents involving the actual left turn movement and rear end collisions with cars seeking to turn left would be greatly reduced. Cars crossing

FIGURE 1

COMPARISON OF ACCIDENT TYPES
ON DIVIDED FOUR LANE PAVEMENTS
AND TWO LANE ROADS

1939



the highway would also find refuge in the widened medial strip, thereby reducing the hazard for cross movement.

3. Cars seeking to turn right should have decelerating lanes to permit them to slow down when making right turns. This should provide further insurance against rear-end collisions.
4. Since 43% of the accidents occurred at intersections, any efforts

toward limiting the number of intersections (there were 181 in the 65 miles of dual roadway) should help in reducing conflicts and thereby accidents.

5. Indiscriminate movement between intersections resulting in rear end collisions and left turn accidents particularly reflect the influence of roadside development. Such actions as cars slowing down suddenly in the traffic stream to turn into a road house, swinging left across the pavement to an eating place, etc., would not be so frequent or so hazardous if roadsides were zoned to restrict these places to locations where adequate provision could be made for ingress and egress.

Other conclusions may be drawn from the accident statistics presented here and from other data available in the original source. But these observations are presented here as an illustration of one of many practical applications to which accident analyses may be put.

PLANNING FOR CITY SUPERHIGHWAYS

CONSTRUCTION of expensive superhighways in large cities should be weighted carefully after thorough study before being undertaken, the five-man highways and transportation committee of the American Society of Planning Officials cautioned in a preliminary report to the National Conference on Planning last month in San Francisco.

Seven recommendations were made, based on the premise that a long-range program of highway development for the nation must be integrated with and be a part of a comprehensive transportation plan embracing all types of transportation. "Likewise a plan for an ultimate major street and highway system for an urban area, to be sound, must be part of a comprehensive local transportation plan, in which highways are integrated with transit, rail, water and air transport, and their terminal facilities and operations. All this must be attuned to desirable community development," the report declared.

Any plan for a more adequate city and suburban traffic, transit and transportation system, the report asserts, should, in addition to meeting present anticipated traffic needs, aim to further a better-balanced urban pattern, more economical to build, maintain and operate.

Members of the committee, who do not all necessarily agree with the findings of the report, are I. S. Shattuck (Mem. I.T.E.), chairman, planning and traffic consultant, Oakland, Calif.; Harry F. Aumack, engineer, city planning commission, Spokane, Wash.; Burton W. Marsh, (Mem. I.T.E.), director, safety and traffic engineering department, American Automobile Association; D. Grant Mickle, (Mem. I.T.E.), traffic engineer, Bureau of Traffic Engineering, Detroit, Mich.; and Ladislas Segoe, (Mem. I.T.E.), planning consultant, Cincinnati, Ohio.

The recommendations urge the use of more planning prior to constructing city superhighways, the need for application of traffic engineering before the need for superhighways is measured, the consideration of mass-transit facilities, that more attention be paid to obtaining and preserving proper right-of-way, and that the recommended planning be the responsibility of local planning agencies, with the help of state and federal officials. A few of the recommendations are discussed here, numbered according to the report.

1. *No major highway improvement should be undertaken except as a part of a comprehensive long term plan of a major street and highway system of the entire urban area or region, which in turn should be derived through studies and be an integral part of a broader plan of transportation facilities—local, suburban and long-distance —including all forms of transport for the entire urban area or region.*

As population density increases, the report says, the use of the private automobile as a means of individual transportation decreases. When flexibility and speed as potential advantages of individual transportation diminish, the resulting congestion discourages further use of the automobile, and people turn to other means, such as bus, street car or rapid transit. Hence, the report finds, it is essential that in planning for the movement of persons and goods within metropolitan areas, consideration be given to both individual and mass transportation.

2. *The long-range transportation plan should—in addition to meeting present and anticipated needs—be in accord with the master plan of development of the community and region.*

At present, relatively few committees have master plans combining all the elements of community development that properly should be included. The means and necessary support for such planning are hard to obtain. Overall planning is usually lost sight of in the promotion and public acceptance of isolated projects such as superhighways, low-cost housing, public buildings, recreation facilities, etc. Expediency, not planning, has guided too many public projects.

A network of high-speed highways might have a number of results. The new facilities might cause enough losses to private operating companies to cause them to discontinue their services, with resulting property-value losses in areas formerly served. The movement to the suburbs probably would be accelerated, leaving behind new blighted areas. Central parking facilities would become less adequate because of the increased number of vehicles. Many businesses would probably move to subcenters.

3. *The need for additional transportation facilities should be measured after traffic engineering has been applied to make the most efficient use of existing street and transit facilities.*

Traffic engineering as a profession is advancing rapidly, declares the report. Many state highway departments and certain cities now employ traffic engineers. More cities should. The services of a traffic engineer are needed in each urban area of any size. One of the most important traffic engineering activities is obtaining the maximum efficiency, convenience and safety from existing street, highway and transit facilities. More people can be transported faster in the same amount of street space or along the same transit line, and with greater safety.

Hazards can be reduced, traffic capacity made larger, speeds increased and delays reduced, and parking improved by various applications of traffic engineering. Among these are the redesign of hazardous and complicated intersections, the signing of through routes for certain purposes, improvement of traffic-signal operation, removal of unnecessary signs and signals, proper lane striping, elimination of curb parking at certain times and places, control of the hours of commercial delivery in congested districts, and better pedestrian and motor-vehicle controls.

6. *More attention should be given by public authorities to the preservation of land needed for highway in advance of construction.*

The acquisition of needed rights-of-way presents probably the greatest problem in the systematic and eco-

nomical carrying-out of a long-term program of major street and highway improvements. The lack or inadequacy of funds, legal inhibitions and cumbersome procedures combine to make land acquisition an almost insurmountable obstacle.

Protection of needed rights-of-way against new structures and means of acquiring such rights-of-way at the most favorable opportunity, well ahead of actual construction if necessary, are imperative for success of planned program of highway development. Other difficulties consist of statutory or constitutional limitations; narrow interpretation of what constitutes a public purpose; cumbersome, expensive and drawn-out procedures under eminent domain statutes, and the absence of, or narrow limitations on, authority for the use of excess taking or excess condemnation.

Planning costs are held to be a charge against the construction of trafficways as much as is the cost of preparing construction plans and specifications. "Road funds should therefore be made available for planning work of this nature. A part of federal and state assistance in such local planning could take the form of a loan of services of highway specialists and other personnel. The existing highway-planning-survey data and additional data in the future should be made ready available in detail to local planning and traffic engineering agencies." Highway authorities should support local planning.

Concluding, the committee said: "It is hoped that this preliminary report will stimulate local planning agencies, traffic engineering departments and all public agencies concerned with highways and other forms of transportation facilities, to the end that more comprehensive consideration of the entire subject be given. In the final report the committee hopes to present a more extensive and penetrating discussion of the entire subject, including the various problems briefly touched upon herein, and to indicate desirable solutions wherever possible. Contributions of data and ideas will be welcomed from highway authorities, planners, traffic engineers, and others professionally interested in this subject.

Condensed from the committee's report which appears in BETTER ROADS, August 1940, pp. 15, 16, 17, 31.

FLYING BLIND ON THE HIGHWAY

By CARL E. FRITTS

A STUDY of the operating conditions of vehicles in the State of Washington indicates that many drivers are in effect doing "blind flying" because of their inability to see any object and stop within the range of visibility.

First of all, it has often been said that the new cars have the most accidents. To determine whether this statement was true or false, a study was made of the reported accidents in 1939 to see what number of each year's model was involved in accidents. The accidents were related to the amount of travel by each year's models. The results of this study are shown in the table.

Since the night accident problem is of such tremendous consequence, our study of operating condition has been principally related to night performance ability. Safe night speed is determined by the condition of lights and brakes—the two targets of depre-

THE RELATION OF CAR AGE TO ACCIDENTS

Year Model	Per cent of Travel	Number of Accidents Rural	Urban	Total	Per cent of Accidents Total	Per cent of Rural Night Accidents
1940	12.8	1,043	2,014	3,057	12.3	11.3
1939	9.0	717	1,330	2,047	8.2	8.2
1938	19.7	1,346	2,948	4,294	17.3	15.6
1937	17.1	1,219	2,704	3,923	15.8	15.0
1936	8.5	733	1,451	2,184	8.8	9.6
1935	5.6	566	1,017	1,583	6.4	7.3
1934	4.4	336	697	1,033	4.2	4.3
1933	2.6	174	366	540	2.2	2.4
1932	4.2					
1931	4.7					
1930	6.0					
1929	3.0	2,079	4,077	6,156	24.8	26.3
1928	1.1		24.6%			
1927	0.8					
1926						
1925 and older	0.5					
Totals	100.0	8,213	16,604	24,817	100.0	100.0

ciation and maladjustment found to be the greatest causes for rejection in our inspection stations.

To determine the safe night speed of vehicles, we had first to determine the range of visibility of headlights, based on the amount of beam candlepower and the location of beam aim. We prepared a curve showing the visibility distance related to beam candlepower and used a dark object having a reflection factor of 3 per cent as the hazardous object. While a black object having a reflection factor of 2 per cent might be encountered, we believed that 3 per cent would be more conservative, since even on a stalled truck with a black body, some object such as a license plate would create a higher degree of reflection. Our next step was to determine the stopping distance of each vehicle at various speeds by measuring the braking distance and adding perception and reaction time. Since the Roper-Howard studies indicated a definitely larger required perception time for unexpected objects at night, and since visibility distance decreases with increased speed, we assumed a perception and reaction time of three seconds.

From a carefully selected sample of 10,713 vehicles we found the average safe night speeds of vehicles passing inspection on the first presentation to be as follows:

Year Model	Safe Speed M.P.H.	Year Model	Safe Speed M.P.H.
1939	43	1932	40
1938	42	1931	40
1937	42	1930	39
1936	42	1929	38
1935	41	1928	38
1934	41	1927 and older	35
1933	40		

We find that the average safe night speed of all year models after meeting inspection requirements is 41 miles an hour. Twenty-five per cent of the vehicles could travel faster than 45 miles per hour and 25 per cent should travel less than 37 miles per hour.

It is difficult to determine what the safe night speeds of the vehicles rejected would be. Of those rejected vehicles that we were able to measure, we found the average safe night speed

to be 37 miles per hour, compared to 41 miles per hour for approved vehicles.

Fifty per cent of all vehicles were in such condition, however, that their maximum safe night speed could not be measured. It is entirely reasonable to assume that the average condition of vehicles not meeting inspection requirements would be considerably lower than 37 miles per hour.

Vehicles rejected on first inspection in 1939 represented 61.55 per cent of the total. Of this group, 25 per cent —or approximately 16 per cent of the total of all vehicles before meeting inspection requirements — had a safe night speed of less than 33 miles per hour.

A vehicle barely meeting our inspection requirements would have a safe night speed of the ridiculously low amount of 29 miles per hour, since our requirements were necessarily placed very low in the beginning of our program. And even with that low standard, we find that 47 per cent of the vehicles fail to pass brake and light tests. After inspection, the average vehicle is capable of 41 miles per hour.

It is evident that inspection requirements must be raised to bring about mechanical efficiency necessary for safety under our present day common speeds and to prevent as much of the "blind flying" as is possible.

We have concluded that it would be logical and practical to present to each motorist a certificate of approval bearing some such message as this: "Due to the operating condition of your vehicle, your maximum safe speed at night is ———— miles per hour."

We are inclined to believe that some such message would bring home to the motorist the importance of proper maintenance of brakes and lights.

It is plainly evident that brakes must be maintained at least to the minimum requirement of 40 per cent braking effort to provide safety in daytime driving.

That requirement would be necessary to provide safety on the most modern highway. And brake requirements would have to be much higher to permit safe travel on the millions of miles of highway not designed to this new standard.

As a result of our analysis, we have arrived at the following conclusions in order to bring about the eradication of the "blind flying" hazard:

1. Speed of vehicle should be limited to performance ability of the individual vehicle.

2. Inspection requirements should be raised to bring about a general higher standard of performance ability.

3. Night speed limits should be lower than day speeds because of the demonstrated lack of vehicle performance ability.

Condensed from an article by Carle E. Fritts, Traffic Engineer, Washington State Highway Department, (Mem. I.T.E.). PUBLIC SAFETY, August 1940; pp. 16, 17, 38.

ARE BUSINESS STREETS FOR PARKING OR MOTORING?

By WALLACE L. BRAUN

AS in most other cities in the United States, the streets in Baltimore were planned long before the advent of the motor car. These streets are as they were, no wider except in instances where some sidewalk width has been added to the street bed. Only in rare cases did such reconstruction add a full traffic lane in each direction. The increased width merely made

travel safer in the one or two existing lanes. As automobiles became more numerous, the demand for places to park along the curbs of the streets increased until it was not long before the available space within the business district was filled early each day.

In 1926 a parking ordinance was passed. Included in the ordinance then passed was the designation of that area of the city now known as the central business district. This area is roughly twelve blocks long and nine blocks wide, covering 0.57 of a square mile. One of the sections of the ordinance prohibited the parking of vehicles on 14 of the streets in the central business district between 7:30 A.M. and 9:30 A.M. and 4:30 P.M. and 6 P.M. In addition, parking was limited to two hours in any one block of the streets mentioned therein between the hours of 9:30 and 4:30 P.M.

Considerable improvement in parking conditions resulted, but traffic *movement* was not much accelerated, especially on those streets used by both free-wheel and fixed-wheel vehicles. This was principally because the loading and unloading of commercial vehicles was not prohibited during the morning and afternoon peak traffic flow.

Another section of this ordinance of 1926 gave the Police Commissioner authority to grant special "No Parking" spaces in front of shipping or receiving entrances to business houses and in front of hotels, office buildings and apartment houses. These permits were granted under the condition that the spaces allotted were to be used exclusively for loading and unloading purposes, and parking would not be permitted. To date, approximately 3,000 of these permits have been issued. *Thus it is seen that although the majority of merchants vigorously object to the general prohibition of parking, they inadvertently subscribe to its elimination by making application for such permits.*

There was no change in the general parking laws in the central business district from 1926 until 1937. In 1937 a new ordinance was passed covering all 29 major streets in the district. This new ordinance was similar to that of 1926 except that the period when parking was *not* permitted in the morning was changed from 7:30 A.M.-9:30 A.M. to 7:45-10; and the afternoon period was changed from 4:30-6 to 4:45-6. This latter position was obviously a step backwards.

At the same time another ordinance was enacted which was definitely a step forward. It affected 11 streets leading to the central business district, and provided that no parking, loading or unloading of freight or merchandise would be permitted on the right-hand side of these streets with reference to inbound traffic from 7:45 to 9 A.M., or on the right-hand side with reference to outbound traffic from 4:45 to 6 P.M. These restrictions applied for a distance of 1½ miles from the limits of the central district. This ordinance provides an approach to the ultimate that can be expected in street use—that of utilizing the whole area from the center to the curb for the movement of vehicles. Prior to its enactment nearly all traffic approaching the business area was relegated to a single lane, resulting in much lost time and inconvenience. Needless to say, there was a speed-up in traffic flow.

In March, 1940, this ordinance was amended to include two more streets. Still more important, a further amendment provided for an extension in both the morning and afternoon restricted periods—now 7:30 to 10 and 4 to 6. These latter restrictions are more in keeping with the actual period of peak traffic flows shown by the chart of actual conditions on one of

the streets to which the ordinance applied. It shows the half-hourly average of all the vehicles passing each intersection in both directions within the limits provided by the ordinance.

Constant patrol by motorcycle officers during the peak traffic-flow periods is necessary in order to maintain a high efficiency of operation of the ordinance.

The sequence of the enactment of the foregoing ordinances shows a definite trend towards the general elimination of parking in the central business district. The frequent necessity for commercial vehicles to double-park when making deliveries is a positive indication that the enactment of such an ordinance would be most timely and should be accomplished.

But the elimination of parking is only a part of the solution. Mr. Motorist would still like to go from his home to the business area in the shortest possible time and find a place to park his car convenient to his destination for as long as necessary. Although the present-day parking lot has served a very definite need, many motorists do not use it because of the relatively high fee charged. In many instances these lots are not conveniently located. It is the opinion of the writer that the provision of adequate terminal facilities should be a municipal function. It is probable that these facilities could be more efficiently located to the profit of both the motorist and the city government. *The fee should be nominal, yet ample to defray the cost of operation and at the same time reimburse the city for loss in tax revenue resulting from the razing of the building occupying the sites required for these off-street parking facilities.*

Condensed from an article by Wallace L. Braun, Traffic Engineer, Baltimore Police Department (Affil. I.T.E.). AMERICAN CITY, August 1940, pp. 85, 87, 89.

A STUDY OF MOTOR-VEHICLE DRIVERS AND SPEED IN CONNECTICUT

By HARRY DESILVA

FACTUAL data regarding the influence of speed on highway accidents are very scarce, although a great deal has been said and written about speed as a cause of accidents. Before this problem can be solved it is necessary to find out who the speeding drivers are, how many there are, and when and where they drive. This can only be accomplished by coordinating the speeds of vehicles using the highways with certain facts regarding the individual drivers.

The first of a series of investigations to throw some light on speed as related to the characteristics of individual drivers was conducted in Connecticut during the summer of 1939 by the Driver Research Center at Yale University, in cooperation with the American Association of Motor Vehicle Administrators, the U. S. Public Roads Adminsitration, State Police, and Highway Departments. This study was the first serious attempt to gather facts about the characteristics of operators whose driving speeds were accurately measured. Being the first study of its kind, it is somewhat fragmentary; but in spite of its incompleteness it is offered as a pattern that can be altered or amplified in future studies.

The findings of this investigation, which involved a comparatively small number of drivers, must be consid-

ered as tentative until corroborated by studies in other States. A driver-speed investigation has recently been completed in South Carolina and similar studies are now under way in other States.

A survey was first made of various main roads in the vicinity of Hartford, Connecticut, to select tangent sections of highways relatively free from physical hazards that might influence vehicle speeds. All observations were made on weekdays between the hours of 10 A.M. and 4:30 P.M. The weather was clear and warm and visibility excellent except during the studies at station 9 where there were intermittent showers.

At the end of the day the registration numbers on the questionnaires were matched with the registration numbers and speeds obtained at the speedmeter location. When there was any doubt about matching the registration numbers the questionnaire concerned was discarded. Two thousand six hundred and sixty-four questionnaires were identified and found to be complete enough for use in practically all of the subsequent analyses.

Summary

The findings of this investigation are necessarily qualified by the conditions of this survey and must be considered as specifically pertinent only to drivers represented by the sample obtained. They are:

1. Out-of-state motorists drive newer cars, carried more passengers, and traveled faster than Connecticut drivers.

2. Young persons drove faster than older persons.

3. Non-owners, especially the younger persons, drove slightly faster than owners.

4. Women drove nearly as fast as men.

5. Drivers on long trips traveled faster than drivers on short trips.

6. Lone drivers and drivers with passengers to whom they were not related drove faster than drivers with passengers related to them.

7. Newer vehicles were driven faster than older vehicles.

8. Drivers who traveled faster than 50 miles per hour had been involved in more accidents, traffic violations, and speeding violations than drivers who traveled between 35 and 45 miles per hour.

Other points which the study indicates for this sample of drivers are:

1. Men drove nearly twice as far each year, were not accompanied by as many passengers, and had been involved in more accidents than women.

2. Women drivers under 25 years of age had had as many years driving experience as men of the same age, but older women had had considerably less driving experience than men of the same age.

3. Newer vehicles were driven more miles each year and were involved in more accidents than older cars.

4. Drivers between 40 and 50 years of age owned a relatively large proportion of the new cars and had as many years of driving experience as men in the older age brackets.

5. Men between 30 and 50 years of age traveled more miles each year than either younger or older drivers.

6. The annual travel for the men with less than 2 years of driving experience was relatively low, but increased progressively up to 5 years of experience.

7. The majority of older drivers operated old cars.

8. Vehicles approaching a city traveled faster than vehicles that have recently left a city.

Condensed from an article by Dr. Harry R. DeSilva, Research Associate in Psychology, Driver Research Center, Institute of Human Relations, Yale University. PUBLIC ROADS, July 1940.

CARS SLOW SELVES TO ENTER TOWN

By CHARLES ADLER, JR.

RESIDENTS of Middletown and Bridgeville, Del., are now safeguarded against speeding traffic. Main streets of these towns are State highways over which traffic moves at about forty-five miles an hour. Motorists from the open road formerly entered the towns at speeds unsafe for negotiating the congested districts carefully. Townspeople were jeopardized.

To control cars approaching the towns to a safe maximum speed, the Delaware State Highway Department, under the direction of W. W. Mack, the chief engineer, recently installed a speed control signaling system at each entrance to the towns.

The system comprises a traffic signal suspended over the highway on a mast-arm at an entrance to the town. The signal normally displays the red light. A mechanism housed in a cabinet on the signal pole is connected by underground wires to a vehicle-actuated detector embedded in the right-hand lane of the highway approximately 200 feet in advance of the signal.

Car Itself Changes Light

When a car approaching the town passes over the detector, the control is set in operation, and after a delay of several seconds the signal indication is changed from red to green. The delay is equal to the number of seconds required for a vehicle to traverse the distance between the detector and the signal if the rate of speed is not more than the maximum set for the safe entrance into the town.

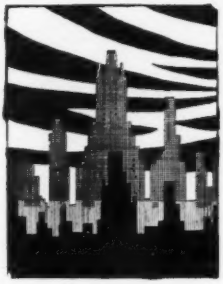
If the driver reduces the speed of his car upon seeing the red signal, the indication will change from red to green just before he reaches it and permit him to enter the town without stopping. If traveling too fast, the driver must pause momentarily before the green indication appears.

In the event of a line of closely following vehicles, the green light switched on by the first car remains on until there is a gap in the line. The signal then reverts to the normal red.

To guard against the failure of either the red or the green light, caused by the burning out of bulbs, double filament incandescent lamps are used. When one filament burns out, the other continues to illuminate the signal until the maintenance crew replaces the lamp.

At Middletown and Bridgeville the speed-control systems are proving to be an effective means of preventing accidents.

An article by Charles Adler, Jr., (Affil. I.T.E.), NEW YORK TIMES, August 18, 1940.



Traffic Engineering NEWS

New Editor for "Traffic Engineering"

With the next issue of TRAFFIC ENGINEERING, Professor Lawrence B. Tipton, now Special Associate Editor, will become Editor. Professor Tipton who is Head, Bureau of Public Safety, Rutgers University, brings a wealth of experience, training and ability to his new task. The Institute is very fortunate in securing his services as editor of its magazine.

We feel that TRAFFIC ENGINEERING has been improved under our direction during the past three years. This improvement must be continuous to keep pace with a growing profession. The task of the Editor is of constantly increasing importance and magnitude. It is gratifying to turn the editorship over to capable hands, and to continue to help as much as possible as an associate editor.

BRUCE D. GREENSHIELDS, *Editor*

1939-1940 Cooperative Activities

Advisory Committee, Center For Safety Education, N.Y.U.
W. Graham Cole, Representative

ASA Sectional Committee—D7
Dwight M. McCracken, Representative
Nathan Cherniack, Alternate

ASA Traffic Standards Committee
Arnold H. Vey, Representative
Robert A. Mitchell, Alternate

Committee on Uniform Traffic Accidents Statistics—I.C.C.
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William A. Van Duzer, Alternate

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Traffic Control Committee—Public Works Association
Burton W. Marsh, Representative

NOTE: Through an error the names of Sidney J. Williams and Lewis W. McIntyre were not included in the members of the Policy Committee.

ELEVENTH ANNUAL CONVENTION TO BE BEST EVER

Under the leadership of an energetic Program Committee headed by George Barton, convention plans are rapidly reaching a conclusion. Advance registrations indicate a record-breaking attendance. The Stevens Hotel has reserved an entire floor exclusively for I.T.E. members and friends. If you haven't yet made your reservation, do so at once to assure preferred location. Address reservations to W. R. Abbott, Jr., Chairman, Convention Arrangements Committee, 400 North Michigan Avenue, Chicago, Illinois.

The last issue of TRAFFIC ENGINEERING outlined the preliminary program. Here is a brief resume—refer to the July issue for details.

Saturday, October 5

1:00 P.M.—OPENING GENERAL SESSION.

1:15 P.M.—MEETINGS OF ALL I.T.E. COMMITTEES.
This is your best opportunity to keep in touch with, and help in, the work of the Institute. Don't miss this opportunity. I.T.E. members not appointed to any committee are cordially invited to attend the meeting of the committee in whose work each is most interested. Please do so without special invitation.

Saturday, October 5

2:00 P.M.—BUSINESS MEETING AND ELECTION OF OFFICERS.

Monday, October 7

ON MONDAY BEGIN THE PUBLIC SESSIONS. All interested in traffic and traffic safety are cordially invited. *Members are specially urged to bring with them local traffic officials and representatives of safety organizations in their communities.*

8:00 A.M.—BISCUIT BANTER BREAKFAST. A sell-out last year and guaranteed to be one of the highlights of the convention this year. Be sure to bring your friends. This is one of the finest opportunities to get acquainted with your associates on a "first name" basis.

9:45 A.M.—Glorifying the "Bull Session." This meeting, a radical departure from other years, takes the bull session out of private rooms into a rough-and-tumble down-to-earth problem session. Everybody will participate.

2:00 P.M.—JOINT SESSION WITH STREET AND HIGHWAY TRAFFIC SECTION, NATIONAL SAFETY COUNCIL. Outstanding authorities will discuss the general traffic accident situation with emphasis on the pedestrian problem.

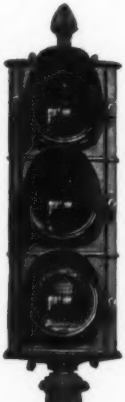
Tuesday, October 8

9:15 A.M.—PROBLEM SESSION on five important phases in the traffic engineer's job—things he faces and must lick daily.

2:00 P.M.—IN THIS CLOSING GENERAL SESSION traffic engineers are to be asked to look into the future and visualize where traffic engineering is leading and what its future problems and promises are.

7:00 P.M.—ANNUAL DINNER. An outstanding speaker of national reputation will talk—not on a technical subject—but about grass-roots problems of modern professional life.
The Resolutions Committee, with a noted cast of elephants and glamor girls, closes the convention with a resounding "whack." Be there and hear and see the "whacking." Don't forget to bring the ladies and your friends.

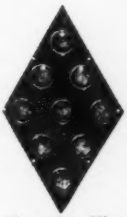
ELECTRIC SIGNALS



Standard signals adapted for all types of mounting. Synchronous and induction control mechanisms and accessory devices.

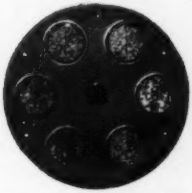
REFLECTOR SIGNALS

When signs are not enough or expense is a factor, reflector signals keep down both cost and accident rate.



10" x 18"; Nine 1⅝" Stimsonites

8"; Six 1⅝" Stimsonites



15"; Six 3" Stimsonites

REFLECTOR SIGNS

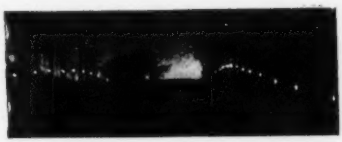
Large Stimsonized and standard reflector button signs for all traffic conditions.

60" SIGN
18" LETTERS

24" SIGN
6" LETTERS

DELINEATORS

Reflector Delineation gives essential road information after dark at daylight distances. The alignment and driving limits of the road are outlined by a channel of light.



SIGNAL CORPORATION SS SIGNALS SERVICE ELIZABETH, N. J.

Why Go To Conventions?

ANONYMOUS

Perhaps more than any other manifestation of the gregariousness of a democracy, conventions have been held up to scorn and ridicule as an indication of man's gullibility. But conventions, despite all this, persist. Once a man tried to silence them by organizing an association to abolish conventions. Before long he had built up such a large national organization that he began holding conventions to decide how to abolish conventions.

A convention is the culmination of the work of an organization of people with common interest. Without it, voluntary professional organizations could not exist. No community of thinking can be engendered by correspondence and reading alone. It is face-to-face contact that makes transmission of ideas most effective. Despite all advances in methods of communication, nothing has been developed to better the spoken word, spoken in the presence of two or more people.

Professional groups depend for their advancement upon idea transmission. No matter how many volumes are written on the subject, people can only come to a mutual understanding when there is a true opportunity for a meeting of the minds or for the direct opposite.

To succeed in professional endeavor it is essential that a man associate with and know personally a substantial number of others with like interests. Only a general meeting, which we call a convention, can accomplish this.

To get the most out of the convention, there are only two things that must be done. After these, a man can do as he pleases with his spare time, but he won't have much to waste:

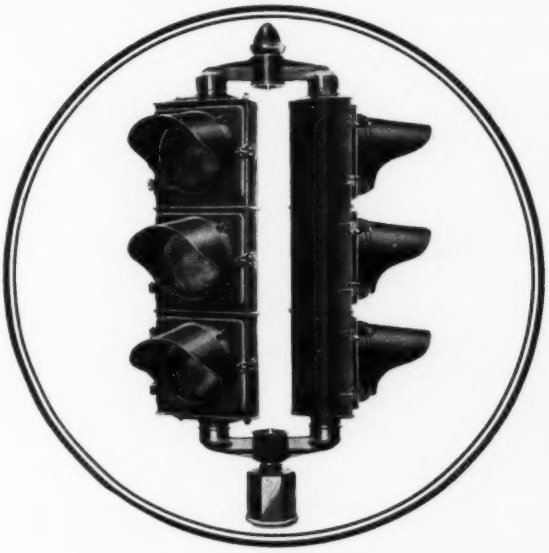
1. Attend every session. Don't say "Those speakers can't tell me anything." The man with that attitude has no conception of what there is to learn about his job. Even though one is not especially interested in the particular subject of the session, he will certainly pick up at least one idea that will be worth the time he spends. It may be nothing more or less than learning how to put a complicated point over to an audience or even how *not* to make a speech. The latter may be even of more value than the first.
2. Take every opportunity to get acquainted with other delegates. Don't hesitate to introduce yourself. Join the "bull sessions" after the day's work is over and when the field of conversation is not limited by rigid program specifications. Participate in the discussions. Argue pro and con the things about which you are interested. Don't be afraid that you are less well informed on some subject than are others. You may be surprised. Talk and listen. Do both, but do neither to the exclusion of the other.

Any man who does these things at a convention will come out a wiser man even though the only added knowledge that he gains is that there is little about his particular field of work in which others know more than he does. Such knowledge should encourage him to develop still further and hold that advantage in an expanding field of knowledge.

"Experiences of Cities with Painted Traffic Lines"

The American Public Works Association announces a revised edition of BULLETIN No. 4, "Experiences of Cities With Painted Traffic Lines." It contains data on specifications, special tests, frequency of painting, methods of application, durability on various pavement types, and other pertinent factors concerning painted traffic lines. This bulletin is greatly increased in scope as compared to the earlier edi-

DO YOU KNOW EVERYTHING THERE IS TO KNOW ABOUT TRAFFIC SIGNALS?



THEN you must know about the BETTER-BUILT features of MARBELITE Traffic Signals . . . the signals which work on any type control and meet with all Standards of Uniformity.

Does your City believe in a uniform system of Traffic Signals? This system can still be maintained . . . with the installation of MARBELITE SIGNALS.

Proof! Note the many Cities that have switched to Marbelite Signals with the past few years . . . New York, N. Y., Philadelphia, Pa., Columbus, Ohio, Lansing, Michigan . . . and many others throughout the Country.

Why? Just look at the above signal . . . isn't it the finest job you have ever seen . . . strong, compact, sturdy assembly with those new aluminum mounting brackets; replacing the conventional pipe and fittings arrangement. That's a BETTER-BUILT TRAFFIC SIGNAL . . . a MARBELITE SIGNAL . . . a Signal that will meet with any City's Traffic requirements.

Don't pay more for something which you can receive for less . . . give MARBELITE the chance to figure on your next job.

Split up your purchase requisitions—call separately for

TRAFFIC SIGNALS—TRAFFIC CONTROLLERS

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tion. It will be available late in August; approximately 35 pages; price 50 cents.

News of the Field

Mr. D. Grant Mickle (Mem. I.T.E.), formerly Traffic and Safety Engineer, Michigan State Highway Department, has accepted the position of Traffic Engineer for the City of Detroit. Mr. Mickle has not completely severed his relationship with the Traffic and Safety Division of the Michigan State Highway Department, however. Because he is keenly interested in the development and advancement of traffic engineering in the Michigan State Highway Department, he is serving in an advisory capacity.

Mr. A. W. Bohner has been named the traffic engineer to head the new Division of Traffic Engineer in Nebraska. The division has been set up in the Bureau of Roads and Bridges, a branch of the Department of Roads and Irrigation. Traffic Engineering is an essential function in a balanced traffic safety program for any state. Nebraska has made a decided step forward with the establishment of its new division which is scheduled for an active program of a comprehensive and commendable scope.

Parking Meters Held Illegal in North Carolina

In a recent decision, the North Carolina State Supreme Court reversed a decision of a superior court and ruled that parking meters are illegal in the State of North Carolina. The court pointed out that, although parking may be regulated, there is no state statute which permits a municipality to collect a fee for parking and said that the authority to regulate parking does not mean that "any sort of restriction, whether appropriate or inappropriate, may be applied at discretion."

The ruling was given in a test case against the City of Raleigh, which had installed parking meters. The meters were removed after the ruling.

Traffic Counter for Washington Streets

To assist officials in the District of Columbia in computing the volume of traffic on principal streets, the Public Roads Administration has designed and supervised the installation of 13 fixed automatic traffic counters. These devices consist of a contact detector in the roadway and a recording mechanism. This mechanism is operated by a clock so that it affords an hourly count. In addition to the fixed counters, eight moveable ones are being used.

In an outlying section where there is only a two-lane highway, a counting device operated by a photo-electric cell is being used. While suitable for such locations, the photo-electric cell type of counter would not be able to provide a very accurate record on multi-lane highways where two or more streams of vehicles may pass the same point at the same time.

Pavement Markings in Virginia

Designed to eliminate head-on and side-swiping collisions, a new plan for highway markings in Virginia provides for a varying arrangement of solid and broken lines to designate places where vehicles may and may not cut over from the right-hand traffic lane, the International Association of Chiefs of Police states.

The system uses single broken lines on two- and three-lane highways, except on hills, curves and intersections. A double solid line is used in the center of a four-lane highway, and the lanes on each side of the double solid line are divided by single broken lines.

The Virginia Highway Department reports that owing to the guide lines and the specified cross-over areas designated by the broken lines, the urge by motorists to cross indiscriminately has been curbed and many collisions averted.

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Transportation Consultant Retained by the Regional Planning Commission of Los Angeles County

Mr. I. S. Shattuck, Planning and Traffic Consultant of Oakland, California has been retained as transportation consultant by the Regional Planning Commission of Los Angeles County.

The Regional Planning Commission under the direction of its Chief Engineer, Major Wm. J. Fox, is one of the most active and effective Commissions in the country and is now seeking to perfect a comprehensive transportation plan for the entire county area, properly co-ordinated with a planned development of the area. Transportation of all kinds, housing, zoning, recreation, subdivision control and the other elements of planning, will all be considered with relation to each other in the present study which may require two years for completion.

The utilization of valuable transportation and planning data from recent surveys by other agencies, the collecting of additional data, the analysis of all data from a planning standpoint will be under Shattuck's general direction, working through the Commission's staff.

In inaugurating this program for the Regional Planning Commission, Major Fox has laid out one of the most comprehensive planning projects yet to be undertaken anywhere in the United States.

Publications Received

"Recommendations to Improve Clark Street for Traffic and Trade"

Prepared by the Chicago Motor Club and Chicago Surface Lines for the North Central Association. Its 16 pages are composed solely of pictures, graphs, and charts. This report is unusual in that it presents its recommendations in the pictorial style rather than the more factual, scientific style.

"What NEMA Will Do in 1940"

This 47 page booklet describes the 71 projects which constitute NEMA Activities and Services for 1940.

"Rochester's 14th Annual Traffic Survey"

This traffic survey was made under the auspices of the Traffic Committee with the assistance of the Boy Scouts of America. The usual features are included consisting of parking counts, bridge counts, pedestrian counts, and cordon counts, in addition to traffic flow studies. The Traffic Committee's recommendations are included in the report. Pp. 18, mimeo.

"Motor Vehicle Inspection Campaign —Pennsylvania"

The Bureau of Highway Safety, Department of Revenue, Commonwealth of Pennsylvania, has prepared this five-page, mimeographed report on the Motor Vehicle Inspection Campaign—November 1, 1939 to February 1, 1940. It contains inspection reports and an analysis of these reports.

"State Highway Information"

"State Highway Information" is published by the American Road Builders Association. It includes personnel lists of state highway department heads and district and division engineers. There are also included estimates of funds to be expended and highway mileage to be built during 1940 and actual figures covering similar subjects for 1939. The federal aid statistics give the unexpended balances plus the 1941 allocations for each state. 31 pages; price $1.00.

Texas Conference

More than 200 engineers attended the First Annual Texas Traffic Engineering Conference held in Austin, July 15-20. I. T. E. members and national traffic authorities included Theodore M. Matson, Yale; D. Grant Mickle, Michigan; Guy Kelcey, Signal Service Corporation; Harvey Booth, Arkansas Traffic Engineer; Harry Neal, Ohio; H. S. Phillips, Texas; Kenneth Mackall, Crouse Hinds Company; Bruce Greenshields, T. E. Editor; Thomas E. Willier; Virden Rittgers; Robert O. Swain; M. V. Greer. John A. Darr, Director of the C. I. T. Safety Foundation, was the principal speaker at the all-conference banquet.

Proceedings of the conference are available at a nominal sum. John A. Focht, Professor of Highway Engineering, University of Texas, is in charge of the sale of the proceedings.

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